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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/774,856	02/09/2004	Christopher F. Gallmeycr	99-647.1	9490
719	7590	06/12/2007		
Caterpillar Inc. Intellectual Property Dept. AB 6490 100 N.E. Adams Street PEORIA, IL 61629-6490			EXAMINER LEE, CLOUD K	
			ART UNIT 3753	PAPER NUMBER
			MAIL DATE 06/12/2007	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

ED

Office Action Summary	Application No.	Applicant(s)	
	10/774,856	GALLMEYER ET AL.	
	Examiner	Art Unit	
	Cloud K. Lee	3753	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 April 2007.
- 2a) ☐ This action is **FINAL**.
- 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 13-22 and 27-35 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 13-22, 27-35 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 4/9/2007.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 4/9/07 has been entered.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

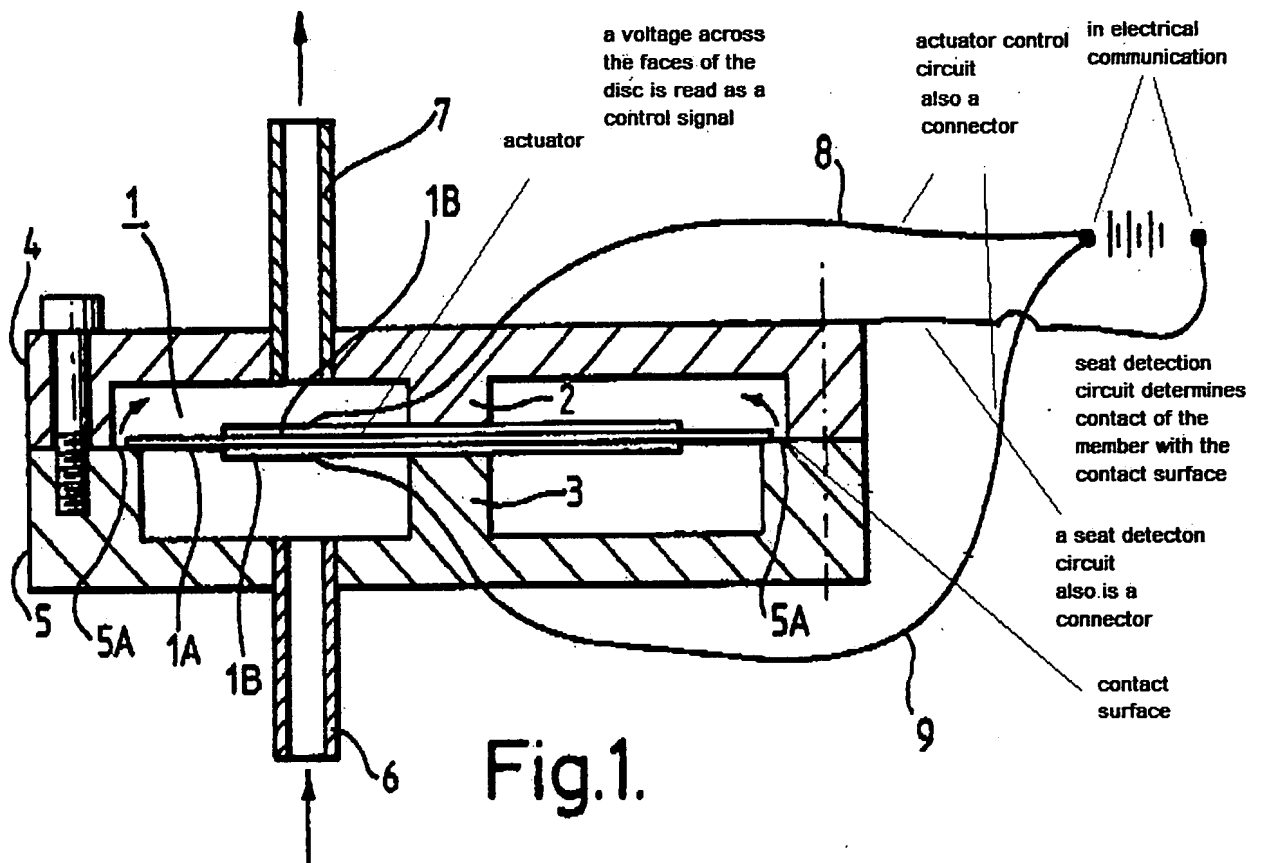
(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 13-14, 27 are rejected under 35 U.S.C. 102(b) as being anticipated by Sims et al (US Patent No. 5,354,032).

Sims et al. disclose a valve comprising an piezoelectric actuator (1A and 1B), an actuator control circuit (8 and 9) in electrical communication with the actuator, wherein the actuator control circuit applies a control signal (a voltage across the faces of the disc is read as a control signal, see Col 3 lines 67- Col 4 lines 5), the control signal controlling movement of the member relative to the contact surface and receives an output from the actuator, a seat detection circuit (5A, also see figure 1) in electrical communication with the actuator control of the member with

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the contact surface from the output, wherein the seat detection circuit detects the impact of the member with the contact surface (5A) by detecting an abrupt change in the amplitude of the output voltage (see figure 4, since the displacement of the device is proportional to the voltage, figure 4 shows an abrupt change in the displacement and the amplitude of the output voltage, also see Col 4 lines 21-22). Please see figure 1 for details. Regarding "connector", applicant's disclosed "connectors" (ref. no. 28, 30 and 32) are lines that supply voltage in the same manner as Itzhaky and Sims et al.



4. Claims 13-22, 27-35 are rejected under 35 U.S.C. 102(b) as being anticipated by Irokawa et al (US Patent No. 6,148,837).

Irokawa et al disclose a valve comprising an piezoelectric actuator (180), an actuator control circuit (from microcomputer 16 to piezoelectric element 180) including a connector (the connector is merely the wires or circuit of Irokawa et al, please see figure 6) in electrical communication with the actuator, wherein the actuator control circuit applies a control signal (a pulse is applied from microcomputer 16 to piezoelectric element 180, see Col 5 lines 28-32), the control signal controlling movement of the member relative to the contact surface and receives an output from the actuator, a seat detection circuit and a position control circuit (Sf, the feedback signal, the position indicator 20 is indirectly in electrical communication with the connector of the actuator control circuit and it determines contact of the member with the contact surface from the output) in electrical communication with the actuator control of the member with the contact surface from the output, wherein the seat detection circuit determines a rate of change of the output (the Sf feedback signal determines a rate of change), wherein the seat detection circuit determines contact of the member with the contact surface from a comparison of the rate of change of the output to a predetermines valve (see figure 4), a velocity control circuit (Sv), in electrical communication with the actuator control circuit and seat diction circuit (see figure 4), wherein the position control circuit determines a charge error as a function of the stored charge value and the current charge valve (Sf), wherein the velocity control circuit determines the input as a function of the charge error (Sv), wherein the position control circuit includes an integrator (when switch 208 is connected, the velocity control circuit is part of the

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position control circuit, therefore, the position control circuit includes an integrator 210), wherein the seat detection circuit detects the impact of the member with the contact surface by detecting an abrupt change in the amplitude of the output voltage (see figure 5, line Sf), the output is used to adjust speed of the member (Sv), wherein the position control circuit includes a comparator that compares a desired charge (Sr and Sf).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 15-22 and 28-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sims et al. in view of Irokawa et al. (US Patent Number 6,148,837).

Sims et al. fail to disclose the control system controlling velocity and position with the control loop. Irokawa et al. disclose a control system used in a similar valve that determines both speed and position with the control loop comparing the actual and the desired parameters. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have used the control system of Irokawa et al. with the valve of Sims et al. in order to provide a control system that can change between a PD (position) control mode and a PID (position and velocity) control mode to eliminate overshoot or an oscillation as taught by Irokawa et al.

7. Claims 13-22 and 27-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Irokawa et al. (US Patent Number 6,148,837) in view of Sims et al (US Patent No. 5,354,032).

Under a more limiting interpretation, Irokawa et al fails to disclose a seat detection circuit wherein the seat detection circuit determines contact of the member with the contact surface.

Sims et al disclose a seat detection circuit (5A, also see figure 1) in electrical communication with the actuator control of the member with the contact surface from the output. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have provided a seat detection circuit in order to provide a close loop control of the piezoelectric member and monitor the voltage by the sense electrode (SE) as taught by Sims (see Col 4 lines 22-26).

Double Patenting

8. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or

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improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

9. Claims 13, 14, and 17 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 2 of U.S. Patent No. 6,285,115 in view of Sims et al.

Claim 2 of '115 fails to disclose an explicit recitation to a seat detection circuit (however, a position control circuit could be considered to encompass a seat detection circuit because the seated position is a position detected by the seat detection circuit). Sims et al. disclose a seat detection circuit used in a similar apparatus. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have used the seat detection circuit of Sims et al. with the device of claim 2 of '115 in order to detect the seated position of the valve and provide a closed loop control of the PE actuator as taught by Sims et al.

10. Claims 13-22 and 27-35 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 2 of U.S. Patent No. 6,285,115 in view of Sims et al. and Irokawa et al.

Claim 2 of '115 fails to disclose an explicit recitation to a seat detection circuit (however, a position control circuit could be considered to encompass a seat detection circuit because the seated position is a position detected by the seat detection circuit). Sims et al. disclose a seat detection circuit used in a similar apparatus. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have used the seat detection circuit of Sims et al. with the device of claim 2 of '115 in order to detect the seated position of the valve and provide a closed loop control of the PE actuator as taught by Sims et al.

The modified claim 2 of '115 fails to disclose all the details to the control system controlling velocity and position with the control loop. Irokawa et al. disclose a control system used in a similar valve that determines both speed and position with the control loop comparing the actual and the desired parameters. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have used the control system of Irokawa et al. with the system of the modified claim 2 of '115 in order to provide a control system that can change between a PD (position) control mode and a PID (position and velocity) control mode to eliminate overshoot or an oscillation as taught by Irokawa et al.

Response to Arguments

11. Applicant's arguments filed 4/09/07 have been fully considered but they are not persuasive.

Regarding applicant's argument that the Examiner has interpreted the Sims et al. reference in a manner contradictory to what the reference actually teaches, the examiner disagrees. The actuator control circuit is in electrical contact with the actuator (please see figure 1), and the seat detection circuit is in contact with the actuator control circuit (please see figure 1) through the power source by the connector (the wires).

Regarding applicant's argument that Irokawa et al. fails to show a sensor circuit electrically connected to the actuator circuit, the examiner disagrees. Figure 6 of Irokawa et al shows each and every single element is electrically connected with wires in the same exact manner as applicant.

Regarding applicant's argument that none of the cited references recognize applicants' claimed strategy for detecting an abrupt stop in an actuator due to an electrical spike in the actuator circuit as detected by a sensor circuit electrically connected to the actuator circuit. The limitation, "detecting an abrupt stop in an actuator due to an electrical spike", that applicants rely on is not recited in the rejected claims.

Conclusion

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Cloud K. Lee whose telephone number is (571)272-7206. The examiner can normally be reached on Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eric Keasel can be reached on (571)272-4929. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

CL

A handwritten signature in black ink, appearing to read "Eric Keasel", with a stylized, cursive script.

ERIC KEASEL
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 3700